GeoProfessional Innovation.

June 13, 2025
File: MO23073A

Mr. Scott Linja, P.E.
Keller Associates, Inc.
733 5th St., Ste. A
Clarkston, WA 99403

RE: Roadway Materials Report
Gun Club Road, Lapwai Road to Stewart Ave
Project No. AO23(881)
Key No. 23881
Nez Perce County, Idaho

Greetings, Scott:

GeoProfessional Innovation Corporation (GPI) has prepared this Roadway Materials Report referencing the Idaho Transportation Department (ITD) Materials Manual Section 240 for the Gun Club Road, Lapwai Road to Stewart Avenue project located along the eastern extents of Lewiston in Nez Perce County, Idaho. These improvements are intended to provide enhanced roadway safety for local patrons and commuters traversing this key travel-way. The purpose of our evaluation was to explore the subsurface conditions along the proposed project alignment and provide geotechnical recommendations to assist design and construction. We accomplished the scope of work outlined in our initial proposal dated April 18, 2023 and subsequent Scope Addendum dated March 4, 2025.

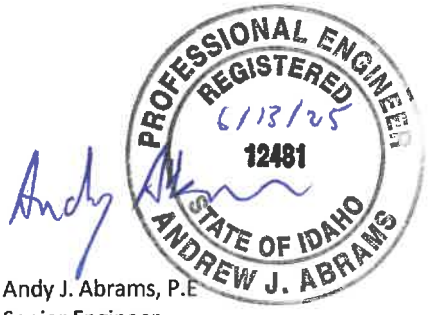
Herein, we summarize our field evaluation, laboratory tests results, and engineering analysis, as well as our geotechnical findings, opinions, and recommendations. Review and implement our geotechnical recommendations in their entirety. Portions or individual sections of our report cannot be relied upon without the supporting text in other pertinent sections.

We appreciate the opportunity to continue our working relationship with Keller on this project. Please do not hesitate to contact us if you have any questions or comments.

Sincerely,
GPI

Noah Hattrup

Noah G. Hattrup, E.I.T.
Staff Engineer



Andy J. Abrams, P.E.
Senior Engineer

AJA/mg

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PROJECT: Gun Club Road, Lapwai Road to Stewart Avenue
COUNTY: Nez Perce County
KEY NO.: 23881

240.00 ROADWAY MATERIALS REPORT

240.01 Introduction

This Roadway Materials Report provide Keller with recommendations for use in design and construction document preparation for road widening and safety improvements along Gun Club Road between Lapwai Road (Lindsay Creek Road) and Stewart Avenue. The improvements are part of a partnered effort between Nez Perce County (County) and the Local Highway Technical Assistance Council (LHTAC).

The project includes design and construction for improvements starting at Gun Club Road's southern intersection with Stewart Avenue, traversing north-northeast and terminating at the intersection with Lapwai Road in the north. The total improvement alignment is approximately 1.47 miles long and is illustrated on Plate 1, *Exploration Map.*

Design plans prepared by Keller Associates, Inc. (Keller) show the planned alignment grades are expected to remain relatively consistent with existing grades along the alignment. The project will include primarily shoulder widening along the east side of Gun Club Road, with new asphalt pavement over widened areas. Other improvements will include new striping, upgraded signage, and guardrails.

The existing Gun Club Road alignment transitions from cut to fill between the western and eastern edge of pavement. The eastern side of the road is situated atop fill embankments along the edge of the drainage east of the road. Existing embankment slopes appear to be relatively steep, about 1.5H:1V (horizontal to vertical) in certain locations. Vertical elevation change between the existing Gun Club Road surface and the creek bottom to the east ranges from approximately 10-feet near the north end of the alignment near Lapwai Road, to more than 100 feet at the south end of the alignment near the Stewart Avenue intersection. The western side of the road is situated primarily over cuts into native soil and bedrock. Existing cut slopes along the western extent of the road alignment are relatively steep along much of the alignment, ranging from 2H:1V to near vertical in some locations.

Grade changes associated with road widening will be accomplished along the eastern side of the entire alignment, requiring fill embankments and geosynthetic-reinforced, wire-faced retaining walls to facilitate grade changes adjacent to the widened roadway. Keller's design drawings show the planned retaining walls will range from approximately 2-feet to 6-feet in exposed height, with embedment ranging from 2- to 4-feet below finished grades. Retaining walls will be constructed entirely in cuts below existing grade, and will bear on subgrades comprising bedrock or recompacted native soil. Outside of planned retaining wall alignments, widening will be facilitated by fill embankments less than 2-feet tall (vertical) with finished slope inclinations up to 2H:1V.

The purpose of this report is to provide geologic conditions and geotechnical recommendations to aid Keller, the County and LHTAC with assessing roadway widening design and construction.

240.02 Vicinity Sketch

Provided as Plate 1, *Exploration Map*.

240.03 Soils Profile/Pavement Condition Survey

The subsurface conditions presented in this report are based on the results of our exploration and laboratory testing program. Field exploration was accomplished via soil borings accomplished on October 16, 2023, and test pits accomplished on March 7, 2025. The time lapse between these 2 exploration efforts was associated with the County and LHTAC receiving cultural clearance from the Nez Perce Tribe to perform test pit exploration. Both exploration phases were observed and documented by a GPI Geotechnical Engineer. The methods and results of the field and laboratory testing programs are summarized in the following sections.

GPI observed 8 exploratory borings within the roadway prism. Borings were advanced at various locations of interest outlined by Keller along the alignment. Boring locations were modified somewhat during exploration due to traffic safety and existing utility conflicts. Borings extended 11.5 to 16.5 feet below the existing ground surface. A boring summary is provided in Table 1.

Table 1: Boring Summary

Boring Number	Approximate Latitude[1]	Approximate Longitude[1]	Total Exploration Depth (feet)	Uncontrolled Fill Depth (feet)	Bedrock Surface Depth (feet)
B-23073A-1	46.391551°	-116.980845°	6.5	N.E. [2]	N.E. [2]
B-23073A-2	46.392932°	-116.980822°	10.4	N.E.[2]	8.0
B-23073A-3	46.394924°	-116.980739°	9.5	2.5	9.0
B-23073A-4	46.398767°	-116.980774°	9.5	N.E.[2]	7.5
B-23073A-5	46.404824°	-116.980881°	11.5	5.5	9.0
B-23073A-6	46.407648°	-116.979565°	9.0	>9.0	N.E. [2]
B-23073A-7	46.409622°	-116.978354°	12.0	N.E.[2]	N.E.[2]
B-23073A-8	46.411154°	-116.977028°	11.5	2.0	N.E.[2]

1. World Geodetic System of 1984 (WGS84)
2. Not Encountered (N.E.)

GPI also observed 7 exploratory test pits along the alignment. Test pits were advanced outside the roadway prism, extending into the fill embankment on the eastern edge of the roadway. Test pits were located 5 to 15 feet laterally off of the roadway shoulder to reduce damage to the existing Gun Club Road pavement section and reduce traffic impacts during our work. Test pits extended 8.0 to 14.0 feet below the existing ground surface. A test pit summary is provided in Table 2.

Table 2: Test Pit Summary

Test Pit Number	Approximate Latitude[1]	Approximate Longitude[1]	Total Exploration Depth (feet)	Uncontrolled Fill Depth (feet)	Bedrock Surface Depth (feet)
TP-23073A-1	46.393445°	-116.980737°	13.0	7.0	12.0
TP-23073A-2	46.394914°	-116.980638°	12.0	4.5	11.0
TP-23073A-3	46.395361°	-116.980616°	12.0	2.5	11.0
TP-23073A-4	46.398795°	-116.980631°	12.0	6.0	9.5
TP-23073A-5	46.400028°	-116.980901°	14.0	5.0	N.E.[2]
TP-23073A-6	46.401113°	-116.980952°	8.5	5.0	7.5
TP-23073A-7	46.402805°	-116.980886°	8.0	4.0	7.0

1. World Geodetic System of 1984 (WGS84)
2. Not Encountered (N.E.)

During exploration operations, traffic control including signs and flaggers were used to close the northbound (eastern) roadway lane along Gun Club Road and facilitate exploration. Borings were completed using a trailer mounted G2400 drill rig equipped with 6-inch hollow-stem augers. Test pits were completed using a CASE 580 backhoe equipped with a 2.0-foot-wide bucket. GPI visually classified and described the soil profiles encountered during exploration referencing the *Unified Soil Classification System* (USCS). Appendix A provides the individual exploration logs summarizing the conditions encountered along with a USCS explanation, which should be used to interpret soil descriptions and references throughout this report. Borings were backfilled with native soil upon completion and plugged with bentonite. Test pits were loosely backfilled with site soil. Where borings penetrated the existing Gun Club Road pavement section, the surface was patched with cold asphalt.

240.03.01 Soils Profile

A soils profile showing the subsurface exploration locations and summarizing exploration results is provided on Plate 5, *Soils Profile*. Subsurface soil information is also presented on the exploration logs included in Appendix A, *USCS and Exploration Logs*.

240.03.02 Pavement Condition Survey

A pavement condition survey was not performed.

240.03.03 Surface Conditions

The existing Gun Club Road alignment is a 2-lane road that is paved with asphalt. The paved surface is approximately 26-feet wide, comprising 2, 13-foot-wide travel lanes. The roadway grade slopes downward to the north at approximately 9%. Roadway surface elevation at the south end of the alignment is approximately 1,215 feet above mean sea level (AMSL). At the north end of the alignment, the roadway surface elevation is approximately 910 feet AMSL. A relatively shallow drainage ditch exists on the western edge of the road alignment. Along the eastern side of the road, the ground surface slopes downward relatively steeply, up to

about 1.5H:1V, into a large drainage pathway east of Gun Club Road. The roadway shoulders are covered by a mixture of grass, weeds, brush and some trees in isolated locations.

240.03.04 Subsurface Conditions

Borings were performed within the existing Gun Club Road pavement prism. No vegetation and organic material was encountered at the ground surface in our boring locations. All borings encountered asphalt at the existing roadway surface ranging from 2.2 to 5.0 inches thick underlain by 4.0 to 10.5 inches of silty gravel base course. In borings B-23073A-6 and -7 asphalt pavement was underlain by 2.0 to 3.0 inches of bituminous surface treatment (BST).

All test pit explorations were performed approximately 5 to 15 feet east of the existing Gun Club Road pavement prism. Topsoil was encountered at the ground surface in TP-23073A-4, -6, and -7 comprising silt that was brown, loose and moist, extending 1.2 to 4.0 feet below the ground surface. Trace vegetation and organics were encountered from 0.2 to 1.0 foot below the ground surface in all test pits.

Beneath asphalt pavement sections and surficial topsoil, we encountered the following primary subsurface units during our exploration:

- **Uncontrolled Fill:** Uncontrolled fill was encountered in most of our explorations, extending 2.5 to more than 9.0 feet below the ground surface. The fill constitutes heterogeneous mixtures of silt, sand, gravel and cobbles with isolated boulders. In some locations, the fill included various debris, such as metal, plastic, glass, wood and other organic material. Fill was described as brown to gray, loose to dense and moist in the locations explored. Due to the varying composition, consistency and debris present within the fill, we consider it to be uncontrolled, and not suitable to support new retaining walls or embankments.

- **Loess**: Beneath asphalt, topsoil and uncontrolled fill, our exploration encountered loess soil comprising silt with varying sand content, that was described as tan to brown, soft to stiff and moist. Loess extended to the termination depth of some explorations, or to the basalt bedrock interface in others at 6.5 to 14.0 feet below the ground surface.

- **Alluvium:** North of the Lone Pine Lane intersection, our explorations encountered alluvial soil beneath surficial asphalt, topsoil and fill. Alluvium comprised silty sand that was brown loose to medium dense and moist. This soil extended to the termination depth of borings B23073A-7 and -8 at 11.5 to 12.0 feet below the ground surface.

- **Basalt Bedrock:** Basalt bedrock was encountered in several borings and test pits between 7.5 to 12.0 feet below the existing ground surface. Bedrock was described as dark grey with orange staining, moderately to highly fractured, moderately to highly weathered and hard. Our drilling exploration equipment (Trailer-mounted G-2400) was able to penetrate basalt bedrock 0.5 to 2.5 feet in boring locations. Test pit excavation equipment (Case 580 backhoe) was able to penetrate bedrock 1.0 to 2.5 feet where encountered.

Consistent, static groundwater was not encountered during exploration and is not expected within the upper 100 feet below ground surface referencing Idaho Department of Water Resources (IDWR) online well reports within 1 mile of the project site. Isolated, perched water tables may be encountered during construction as seeps or springs at any time of the year depending on changes in local and regional precipitation and runoff.

Specifically, we expect water may be encountered in site excavations at the boundary between differing subsurface units, such as the boundary between fill and native soil, or soil and bedrock.

Logs illustrating our exploration findings are included in Appendix A. Approximate exploration locations are shown on Plates 1 through 4, *Exploration Maps*

240.03.04 Laboratory Tests

Samples obtained during exploration were tested in GPI's laboratory to assess their engineering characteristics. Laboratory test results are provided in Appendix B, *Laboratory Test Results* and on the individual exploratory boring logs in Appendix A. The laboratory tests outlined in Table 3 were accomplished referencing *American Association of State Highway and Transportation Officials* (AASHTO) procedures.

Table 3: Laboratory Testing Program

Tests Performed	Purpose
Grain Size Distribution (AASHTO T 11 and T 27)	To identify the constituent particles in the soil, describing the percent by weight of gravel, sand, and fines, ultimately classifying soil type per ASTM D2487.
Atterberg Limits (AASHTO T 89 and T90)	To determine the soil plastic limit, plasticity index, and liquid limit for soil type classification.
Moisture-Density Relationship Curve (AASHTO T 180)	To establish a maximum dry density and optimum moisture content.
Moisture Content Determination (AASHTO T 255)	To determine the soil's in-place moisture content.
Direct Shear (AASHTO T 236)	To estimate the soil's cohesion and angle of internal friction.
Soil pH, Electrical Resistivity & Sulfate Content	To estimate the soil's corrosion potential and impact on buried metal or concrete elements.

240.04 Soil Report Summary

After demolition, site stripping, excavation, backfilling and wall construction to achieve planned subgrades within widened areas of Gun Club Road, we anticipate subgrades above retaining walls will comprise Granular Subbase conforming to Section 703.11 in the latest *ITD Standards.* Outside of wall alignments, subgrade are expected to be existing fill soil comprising heterogeneous mixtures of silt, sand, gravel and cobbles. The fill soil has existed beneath the Gun Club Road alignment for decades without significant settlement or instability evident at the roadway surface. Therefore, our opinion is the fill may remain in-place outside of planned wall alignments and associated reinforced soil zones. However, where existing fill remains below new embankment fills, we recommend subgrades be compacted to Class A requirements prior to any additional fill placement.

A *Soil Report Summary* is included in Table 4 below. Subsurface conditions encountered are illustrated on Plate 5.

Table 4: Soil Report Summary

Station (ft)	Soils at Subgrade	Soil Profile Layer	CBR-value	Estimated Equivalent Single Axle Loads (ESALs)[2]	Flexible Pavement Section Thickness (feet)	
					½ Inc HMA SP-3 (feet)	¾ Inch Agg. Base (feet)
No Retaining Walls 26+50 – 27+33 37+23 – 40+92 57+99 – 59+00 59+91 – 70+48	Existing Fill Soil	ML / SM / GM	15	1,282,293	0.33	0.33
Above Retaining Walls 27+33 – 37+23 59+00 – 59+91	Granular Subbase	GP-GM	50[1]	1,282,293	0.33	0.33

1. Estimated based on correlation to soil type and field test data.
2. See Section 240.05 in this report.

Soil encountered in the borings and test pits was classified according to the *Unified Soil Classification System* (USCS). A summary of the USCS is included in Appendix A and should be used to interpret the terms in this report. Results of laboratory testing are provided in Appendix B and on the boring logs in Appendix A.

240.05 Total Design Asphalt Section Thickness

Average daily traffic (ADT) and commercial ADT counts (CADT) along the planned improvement alignment for Gun Club Road were estimated from data provided by Keller that was recorded from October 27 through November 2020. These data provide average daily vehicle trips along the northbound lane of Gun Club Road over a 12-hour daytime period. Referencing these data, GPI estimated both passenger vehicle and commercial (truck) traffic as well as resulting equivalent single axle loads (ESALs) over an assumed 20-year design period. Table 5 summarizes the provided traffic counts and estimated loading. We recommend Keller review and validate these traffic loading estimates, or provide actual traffic loading estimates so we can refine the estimates herein.

Table 5: Traffic Loading Data - Flexible Asphalt Pavement

Gun Club Road Northbound Lane (Stewart to Lapwai Road)	Estimated 2025 ADT[1]	Estimated 2025 CADT[2]
26+50 – 70+48	2,133	64
	Projected 2045 ADT[1,3]	**Projected 2045 CADT[2,3]**
	3,170	95
	20-year Design ESALs	
	1,282,293	

1. ADT = Average Daily Traffic from ITD Road Data website published in 2017 for SH-54.
2. Assumes 3% Commercial ADT (CADT, Medium Classification)
3. Assumes 2% annual growth over 20-year design period

The following pavement section design recommendations are provided referencing the American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures (Design Guide). The following tables present the design parameters and references, as well as resulting flexible pavement section design recommendations. Table 6 presents design parameters used in our analysis.

Table 6. SH-54 Pavement Design Parameters

Design Parameter	Value Used	References
Reliability (R)	85%	AASHTO Design Guidelines
Standard Deviation (S)	0.45	AASHTO Design Guidelines
Initial Serviceability (PSIi)	4.2	Typical North Idaho area value
Terminal Serviceability (PSIz)	2.2	Typical North Idaho area value
Design Life	20 years	Typical North Idaho area value
Annual Growth Rate	3%	Typical North Idaho area value
Resilient Modulus (Mr)	35,000 psi[2]	Based on Mr correlations to soil type (Granular Subbase)
	8,500 psi[2]	Based on Mr correlations to soil type (Existing Site Soil)
Asphalt Layer Coefficient (a1)	0.44	Figure 2.5 AASHTO Design Guide
Top Course Layer Coefficient (a2)	0.14	Figure 2.6 AASHTO Design Guide
Top Course Drainage Coefficient (m2)	1.0	Table 2.4 AASHTO Design Guide for “fair” drainage, 5 percent saturation

1. Equivalent Single Axle Loads (ESALs)
2. Pounds per square inch (psi)

Table 7 presents our recommended flexible asphalt pavement section design recommendations.

Table 7. Recommended Pavement Section Thickness

Route	Section	Flexible Asphalt Pavement Thickness (feet)	Aggregate Base Thickness (feet)
Gun Club Road – Northbound Lanes	No Retaining Walls 26+50 – 27+33 37+23 – 40+92 57+99 – 59+00 59+91 – 70+48	0.33	0.33
Gun Club Road – Northbound Lanes	Above Retaining Walls 27+33 – 37+23 59+00 – 59+91	0.33	0.33

240.06 Sub-Subgrading
Based on exploration, the general need for sub-subgrading across the entire alignment is not anticipated for construction. However, soft soil areas could be encountered during construction that require over-excavation and replacement with *Aggregate for Untreated Base – Class 1 (Rock Cap)* or *Granular Borrow*. In areas where sub-subgrading is required due to soft, wet, or otherwise unsuitable soil encountered during wet subgrade conditions, excavate this material to stiff, undisturbed soil and backfill per ITD Standards *Section 205 – Excavation and Embankment*.

240.07 Grade Pointing
Grade pointing is not required for this project, as significant cut/fill transitions are not anticipated along the alignment.

240.08 Special Placement
Special placement is not required for this project.

240.09 Compaction
Class A compaction is required for this project.

240.10 Slope Design Summary
Outside of planned retaining walls, slopes taller than approximately 2 feet (vertical) are not required for this project. Keller has established slope inclinations at 2H:1V or flatter referencing ITD requirements.

240.11 Slope Design
Outside of planned retaining walls, slopes taller than approximately 2 feet (vertical) are not required for this project. Keller has established slope inclinations at 2H:1V or flatter referencing ITD requirements. See GPI's *Geotechnical Engineering Report* for information regarding planned retaining walls for this project.

240.12 Embankment Foundation
Outside of planned retaining walls, embankments taller than 2 feet are not anticipated as part of this project. Based on the anticipated soil conditions, post-construction settlement greater than 1 inch is not anticipated beneath planned fills less than 2 feet tall.

240.13 Surface and Subsurface Water
Existing drainage patterns shall be maintained throughout the project area, during and after construction. Surface was will require management depending on seasonal precipitation and runoff conditions at the time of construction. Subsurface water is not anticipated to be encountered within the excavation depths required for roadway widening construction.

240.14 Drainage
Existing drainage patterns will be maintained as part of the planned improvements. Water shall not be allowed to pond on the alignment or at prepared subgrades at any time. Roadway subgrades, aggregate courses, roadway surfaces, ditches, and all other surfaces must maintain positive slopes to prevent water ponding, and direct it away from the alignment, into existing drainage pathways.

240.15 Geosynthetics
Geosynthetics are not required for this project outside of planned retaining walls. See GPI's *Geotechnical Engineering Report* for information regarding planned retaining walls for this project.

240.16 Existing Roadway Material
Existing base material or asphalt concrete pavement excavated during construction may be re-used as fill outside retaining wall alignments and outside of new asphalt pavement and aggregate support sections provided it meets the requirements of ITD Standards Section 205.02B – Granular Borrow.

240.17 Rock Subgrade
Rock subgrades are not anticipated beneath planned asphalt pavement sections as a part of this project.

240.18 Topsoil
Topsoil containing vegetation and organics was not encountered during exploration within the existing roadway prism. However, topsoil containing vegetation and organics was evident outside, and adjacent to the existing roadway prism. Where topsoil is encountered, it must be stripped to remove all vegetation and organics, extending at least 5-feet laterally outside of planned grading and improvement limits. Topsoil should be removed from the site or stockpiled for re-use as surface dressing for revegetation. Topsoil stockpile areas shall be determined by the Contractor during construction, at a location approved by the County and Keller. Topsoil does not require special handling or specialized excavation equipment, but it may require debris removal prior to re-use on-site.

240.19 Pipe
Pipe culverts or other subsurface utilities are not anticipated for this project.

240.20 Riprap
Riprap is not anticipated for the planned roadway widening.

240.21 Staged Construction
Staged construction will not be required on this project for geotechnical/material purposes.

240.22 Pavement Data

240.22.01 Pavement Type and Surface Smoothness

Schedule II should be adequate

Flexible asphalt pavement shall be constructed according to Schedule I smoothness requirements defined in Section 405.03 in the latest *ITD Standards*.

240.22.02 Typical Section

Figures 1 & 2 illustrate the typical sections anticipated for Gun Club widening pavement section construction.

Figure 1: Typical Gun Club Road Widened Pavement Section (Above Retaining Walls)
(Reference: Detail 3A, Sheet 1 of 1, by Keller)

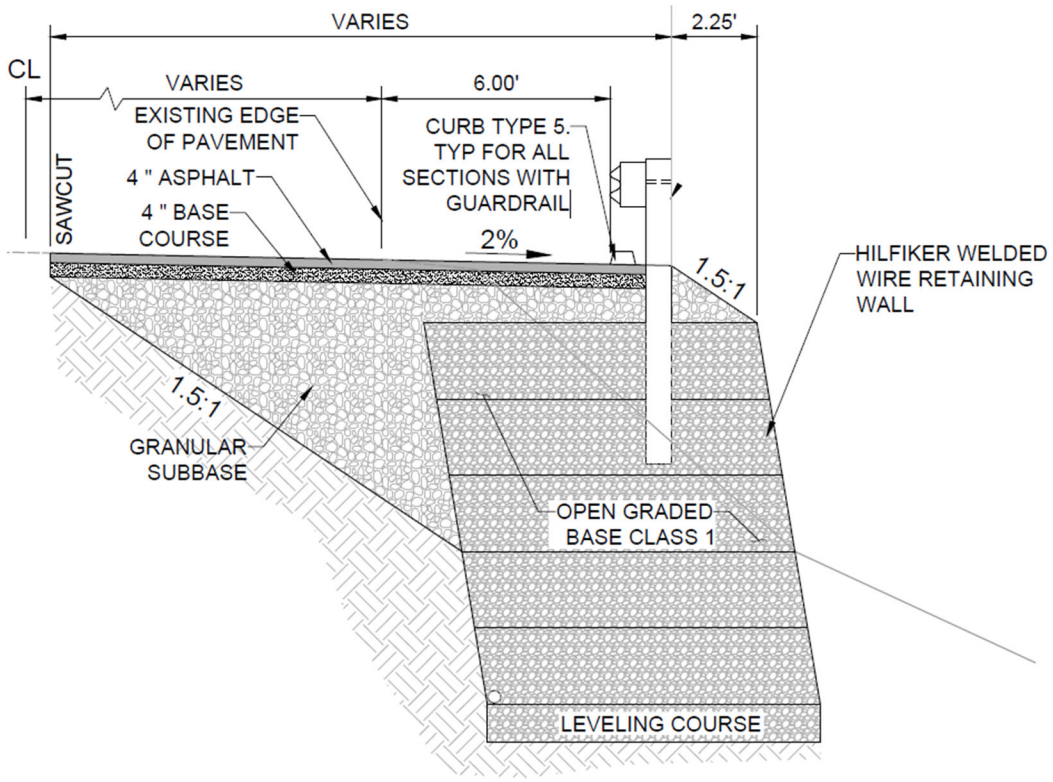
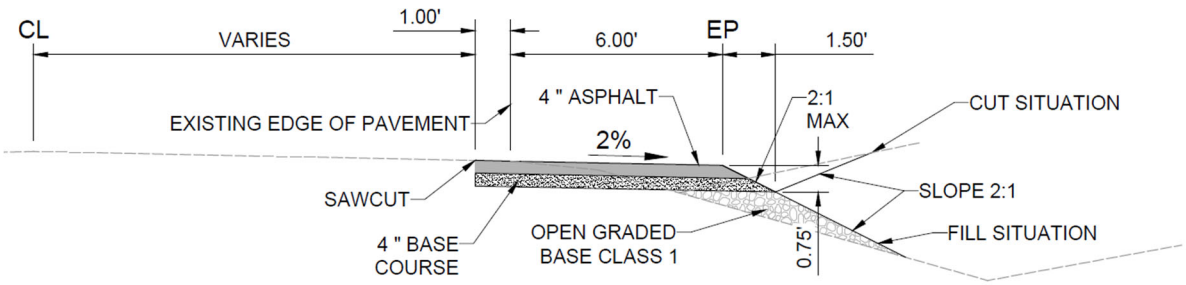


Figure 2: Typical Gun Club Road Widened Pavement Section (Outside of Retaining Wall Alignments)
(Reference: Detail 1, Sheet 1 of 1, by Keller)



240.23 Base

Three-quarter (3/4) inch "Type B" Aggregate for Untreated Base (ITD Standards *Section 703.04*) is recommended for supporting new HMA pavement sections.

240.24 Surface Treatment
Surface treatment is not required for this project.

240.25 Paving
Paving will require an approved HMA JMF meeting the requirements of the latest version of the ITD Standards Section 405. Aggregate for HMA paving shall be ½ inch nominal size. Paving may be accomplished in 1 or 2 paving lifts. Minimum lift thickness shall be 0.17-feet for ½ inch nominal maximum aggregate size HMA.

Not typical. use this on plan sheet

Paving asphalt cement used will be PG 52-22 (or higher grade), and shall conform to the specifications of the latest edition of the ITD Standards Section 405. Binder grade PG 64-28 shall be allowed, per typical practice in the Lewis-Clark Valley. Paving asphalt cement grade was selected using the computer program LTPPBind version 3.1, developed for the Federal Highway Administration (FHWA) by Pavement Systems, LLC. The program output showing the binder grade selection criteria is provided in Appendix C.

240.26 Seal
Seal coats are not required for this project.

240.27 Dust Abatement
Approximately 187,000 gallons of water (187 MG, or 25,000 cubic feet of water) will be required for dust abatement, based on 0.5 cubic feet of water per square foot of subgrade. Estimated 50,000 square feet of subgrade area throughout improvement alignment.

240.28 Aggregate Estimating Data
- *3/4 inch "Type B" aggregate for Untreated Base* at 138 pounds per cubic foot (pcf) including 7.0 percent moisture content. Assume at least 1-inch of loss over *Granular Subbase* for estimating basis.
- *Aggregate for Open Graded Base – Class 1* at 120 pcf including 5.0 percent moisture content.
- *Aggregate for Granular Subbase* at 135 pcf including 5.0 percent moisture content.
- ½-inch HMA Class SP-3 at 148 pcf including 5 percent binder (oil) content.

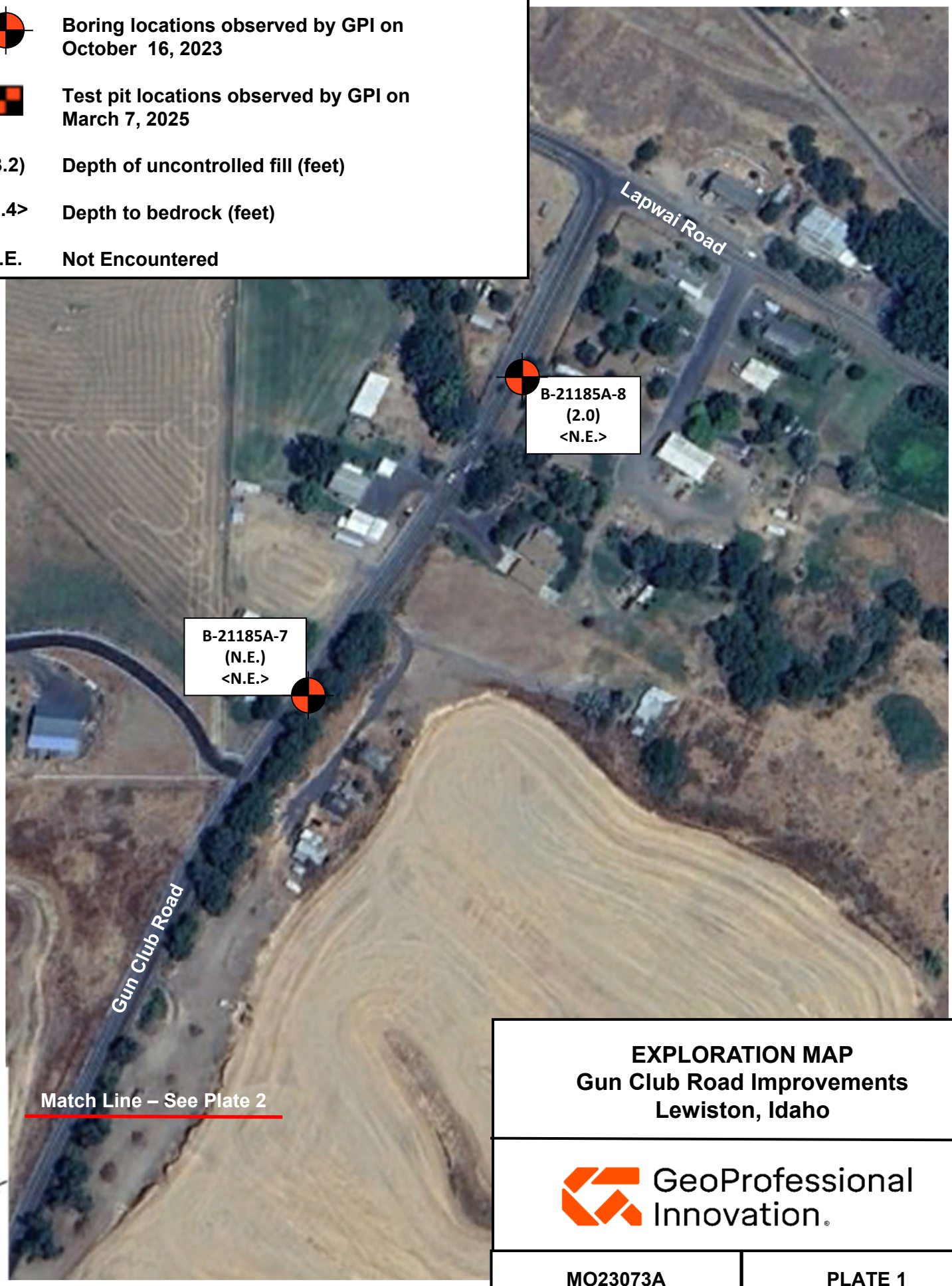
240.29 Aggregate Sources
All aggregates for the project will originate from approved contractor furnished sources.

240.30 Current Specifications and Minimum Test Requirements
This Roadway Materials Report is based on the March 2023 ITD Standard Specifications for Highway Construction, the June 2025 Supplemental Specifications and the November 2019 Idaho Transportation Department Quality Assurance Manual.

240.31 References
1. *Idaho Transportation Department* (ITD) *Standard Specifications for Highway Construction*, 2023 Edition.
2. *2020 ITD Materials Manual*, Idaho Transportation Department.
3. Electronic plans and maps provided by Keller Associates dated March 26, 2024.
4. Traffic counts provided by Keller Associates dated October 20 – November 17, 2020.

LEGEND

- Boring locations observed by GPI on October 16, 2023
- Test pit locations observed by GPI on March 7, 2025
- (3.2) Depth of uncontrolled fill (feet)
- <7.4> Depth to bedrock (feet)
- N.E. Not Encountered



EXPLORATION MAP
Gun Club Road Improvements
Lewiston, Idaho

GeoProfessional Innovation

MO23073A	PLATE 1

Image Reference: © 2024 Google Maps. No Scale intended.

LEGEND

- Boring locations observed by GPI on October 16, 2023
- Test pit locations observed by GPI on March 7, 2025
- (3.2) Depth of uncontrolled fill (feet)
- <7.4> Depth to bedrock (feet)
- N.E. Not Encountered



EXPLORATION MAP
Gun Club Road Improvements
Lewiston, Idaho

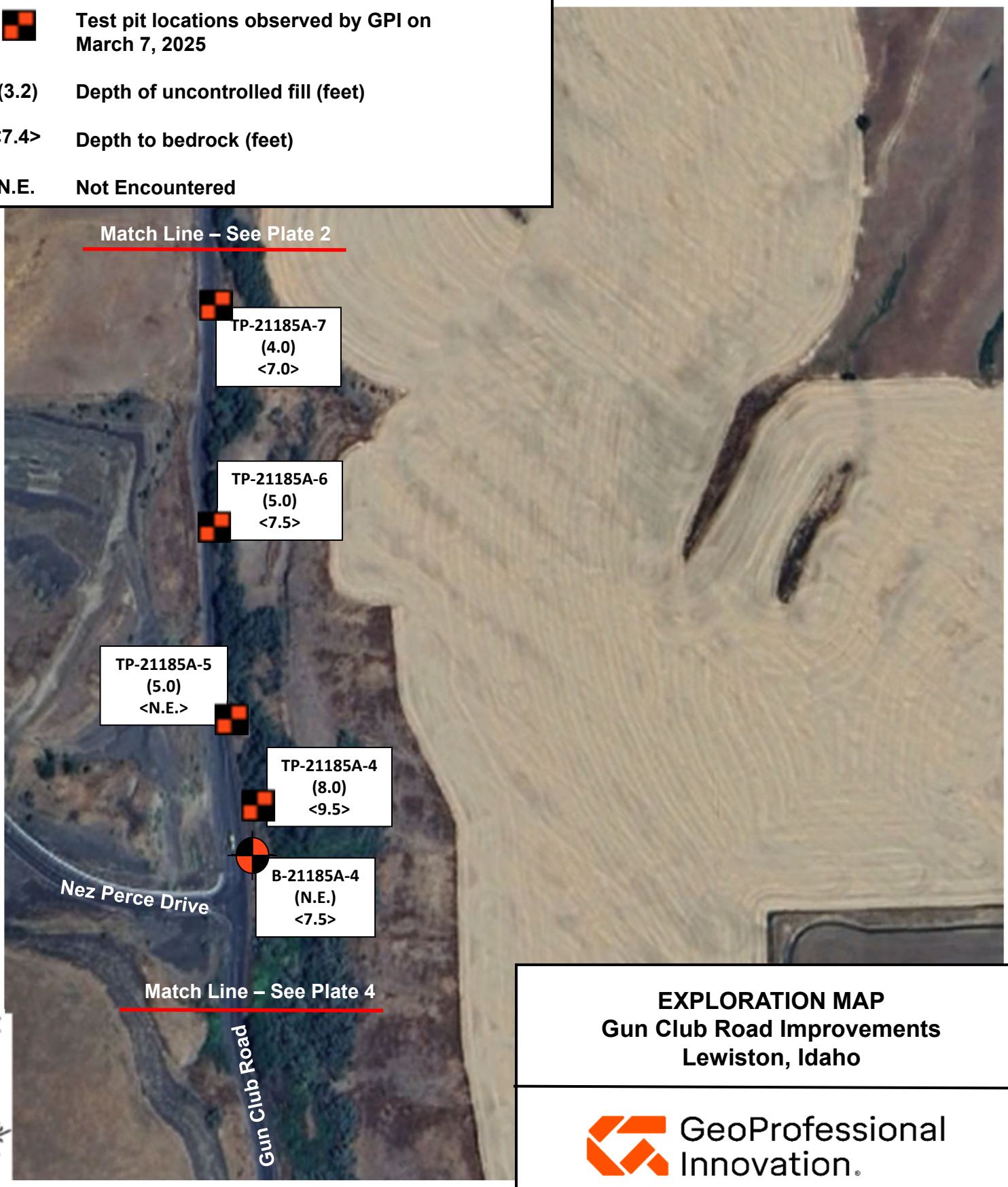
GeoProfessional Innovation

MO23073A	PLATE 2

Image Reference: © 2024 Google Maps. No Scale intended.

LEGEND

- Boring locations observed by GPI on October 16, 2023
- Test pit locations observed by GPI on March 7, 2025
- (3.2) Depth of uncontrolled fill (feet)
- <7.4> Depth to bedrock (feet)
- N.E. Not Encountered



EXPLORATION MAP
Gun Club Road Improvements
Lewiston, Idaho

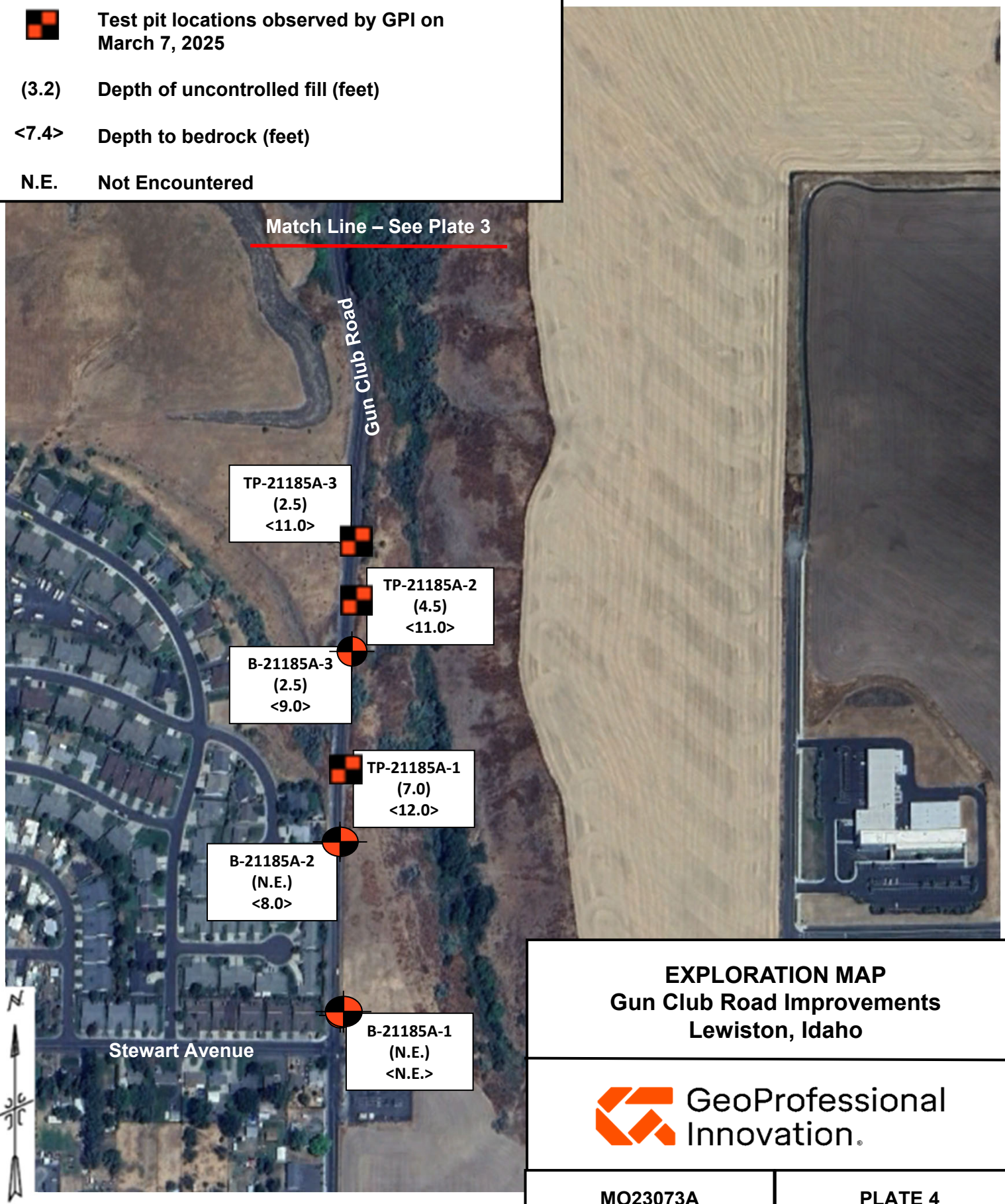
GeoProfessional Innovation

MO23073A	PLATE 3

Image Reference: © 2024 Google Maps. No Scale intended.

LEGEND

- Boring locations observed by GPI on October 16, 2023
- Test pit locations observed by GPI on March 7, 2025
- (3.2) Depth of uncontrolled fill (feet)
- <7.4> Depth to bedrock (feet)
- N.E. Not Encountered

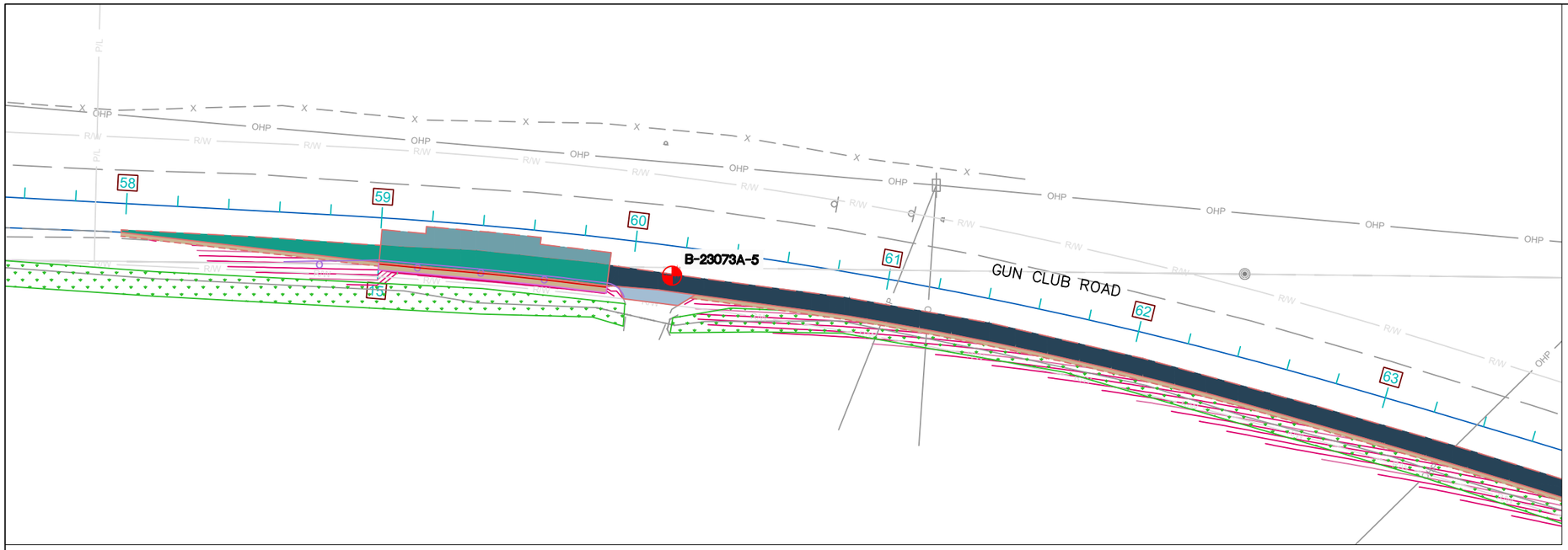


EXPLORATION MAP
Gun Club Road Improvements
Lewiston, Idaho

GeoProfessional Innovation

MO23073A	PLATE 4

Image Reference: © 2024 Google Maps. No Scale intended.

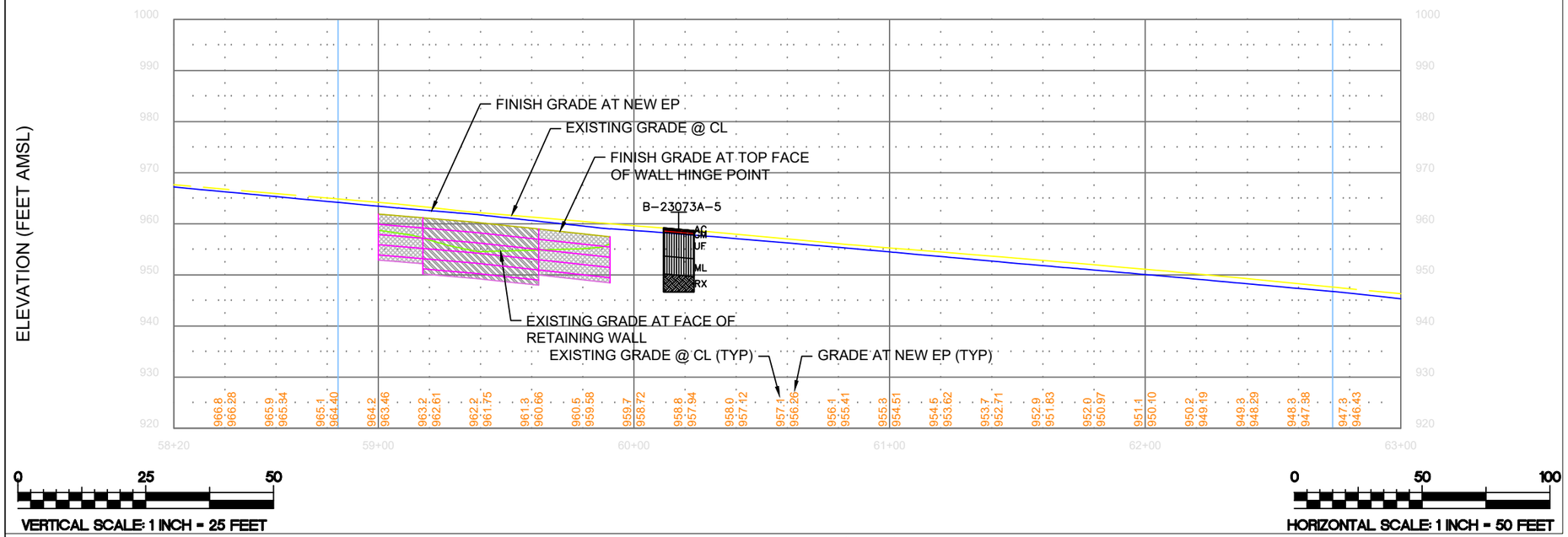


0 50 100

PLAN SCALE: 1 INCH = 50 FEET

PLAN

APPROXIMATE LOCATION OF EXPLORATORY BORING OBSERVED BY GPI ON OCTOBER 16, 2023



0 25 50

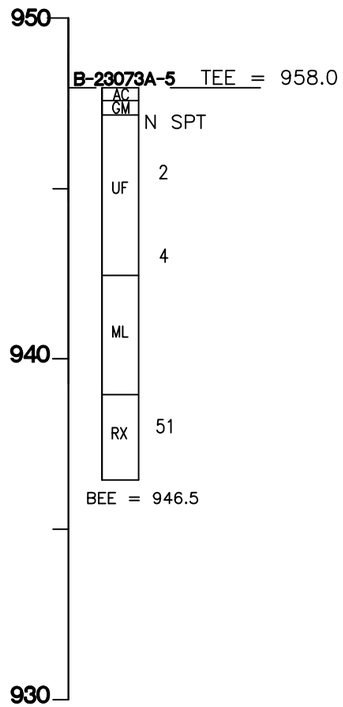
VERTICAL SCALE: 1 INCH = 25 FEET

0 50 100

HORIZONTAL SCALE: 1 INCH = 50 FEET

PROFILE STATION (FEET)

BORING LOG



0 5 10

VERTICAL SCALE: 1 INCH = 5 FEET

LEGEND

TEE–	TOP OF EXPLORATION ELEVATION (Approximate)	BEE–	BASE OF EXPLORATION ELEVATION (Approximate)
AC	ASPHALT CONCRETE	GM	BASE COURSE – SILTY GRAVEL
UF	UNCONTROLLED FILL – SILT WITH SAND	ML	LOESS – SILT WITH SAND
RX	BEDROCK – BASALT		

REVISIONS			
NO.	DATE	BY	DESCRIPTION
1	5/16/25	NGH	FINAL

DESIGNED NGH
DESIGN CHECKED AJA
DETAILED NGH
DWG. CHECKED AJA
CORRECTIONS

SCALES SHOWN ARE FOR 17"X11" PRINTS ONLY

CAD FILE NO. M023073A

DRAWING DATE: MAY 16, 2025

ORIGINAL SIGNED BY:

ORIGINAL DATE SIGNED:

IDAHO TRANSPORTATION DEPARTMENT

GEOPROFESSIONAL INNOVATION CORPORATION

English

PROJECT NO. A023(881)

SOIL PROFILE

GUN CLUB ROAD WALL SECTION – STA 59+50

BRIDGE KEY NO.

COUNTY NEZ PERCE

KEY NO.

DRAWING NO.

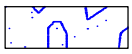
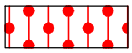
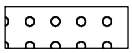
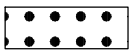
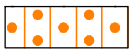
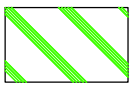
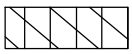
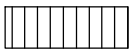
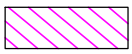
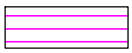
SHEET 1 OF 1

Reference: Base files were provided by Keller & Associates Inc.

APPENDIX A

Unified Soil Classification System (USCS) and Exploration Logs

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GRAPHIC SYMBOL	GROUP SYMBOL	TYPICAL NAMES
COARSE GRAINED SOIL	GRAVEL	CLEAN GRAVEL		GW	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES.
				GP	POORLY-GRADED GRAVEL, GRAVEL-SAND MIXTURES.
		GRAVEL WITH FINES		GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES.
				GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURES.
	SAND	CLEAN SAND		SW	WELL-GRADED SAND, GRAVELLY SAND.
				SP	POORLY-GRADED SAND, GRAVELLY SAND.
		SAND WITH FINES		SM	SILTY SAND, SAND-SILT MIXTURES.
				SC	CLAYEY SAND, SAND-CLAY MIXTURES.
FINE GRAINED SOIL	SILT AND CLAY LIQUID LIMIT LESS THAN 50%			ML	INORGANIC SILT, SANDY OR CLAYEY SILT.
				CL	INORGANIC CLAY OF LOW TO MEDIUM PLASTICITY, SANDY OR SILTY CLAY.
				CL-ML	INORGANIC MIXED CLAY AND SILT.
				OL	ORGANIC SILT AND CLAY OF LOW PLASTICITY.
	SILT AND CLAY LIQUID LIMIT GREATER THAN 50%			MH	INORGANIC SILT, MICA- CEOUS SILT, PLASTIC SILT.
				CH	INORGANIC CLAY OF HIGH PLASTICITY, FAT CLAY.
				OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY.
				PT	PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS.

BORING LOG SYMBOLS

STANDARD 2 INCH OD SPLIT SPOON SAMPLE



CALIFORNIA MODIFIED 3 INCH OD SPLIT SPOON SAMPLE



ROCK CORE



SHELBY TUBE 3 INCH OD UNDISTURBED SAMPLE



TEST PIT LOG SYMBOLS

GRAB BAG SAMPLE

BG

BULK SAMPLE

BK

RING SAMPLE

RG

GROUNDWATER SYMBOLS

GROUNDWATER AFTER 24 HOURS



GROUNDWATER AT TIME OF EXPLORATION



GROUNDWATER AT THE END OF EXPLORATION



GeoProfessional Innovation®

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks Note: BGS = Below Ground Surface
ASPHALT CONCRETE - 5.0" THICKNESS, black (SP) BASE COURSE - POORLY GRADED SAND WITH GRAVEL, gray, medium dense, moist (ML) LOESS - SILT WITH SAND, brown, firm to stiff, moist	0 5	SP ML	BK BG BK	1 3 4 4 5 5	7 10		3.3 13.2	
Borehole Terminated at 6.5 Feet.								Borehole plugged with bentonite and patched with cold mix asphalt

Client: Keller Associates	**Boring Number:** B-23073A-1	GeoProfessional Innovation.	**EXPLORATORY BORING LOG**
Project: MO23073A	**Date Drilled:** 10-16-2023		
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.		
Depth to Groundwater: N.E.	**Logged By:** AJA		Sheet 1 Of 1

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
ASPHALT CONCRETE - 2.5" THICKNESS, black (SP) BASE COURSE - POORLY GRADED SAND WITH GRAVEL, gray, medium dense, moist (ML) LOESS - SILT WITH SAND, brown, firm to stiff, moist	0	SP						
		ML		6 9 8	17			
	5			1 2 7	9			
(RX) BEDROCK - BASALT, dark gray with orange staining, hard, Moderately Weathered and Moderately Fractured		RX						Drill chatter from 8.0 to 10.0 feet BGS
	10			50/4.0"	50+		50+	
Borehole Terminated at 10.4 Feet.								Borehole terminated due to practical refusal on dense bedrock. Borehole plugged with bentonite and patched with cold mix asphalt

Client: Keller Associates	**Boring Number:** B-23073A-2
Project: MO23073A	**Date Drilled:** 10-16-2023
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.
Depth to Groundwater: N.E.	**Logged By:** AJA

GeoProfessional Innovation.

EXPLORATORY BORING LOG

Sheet 1 Of 1

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ

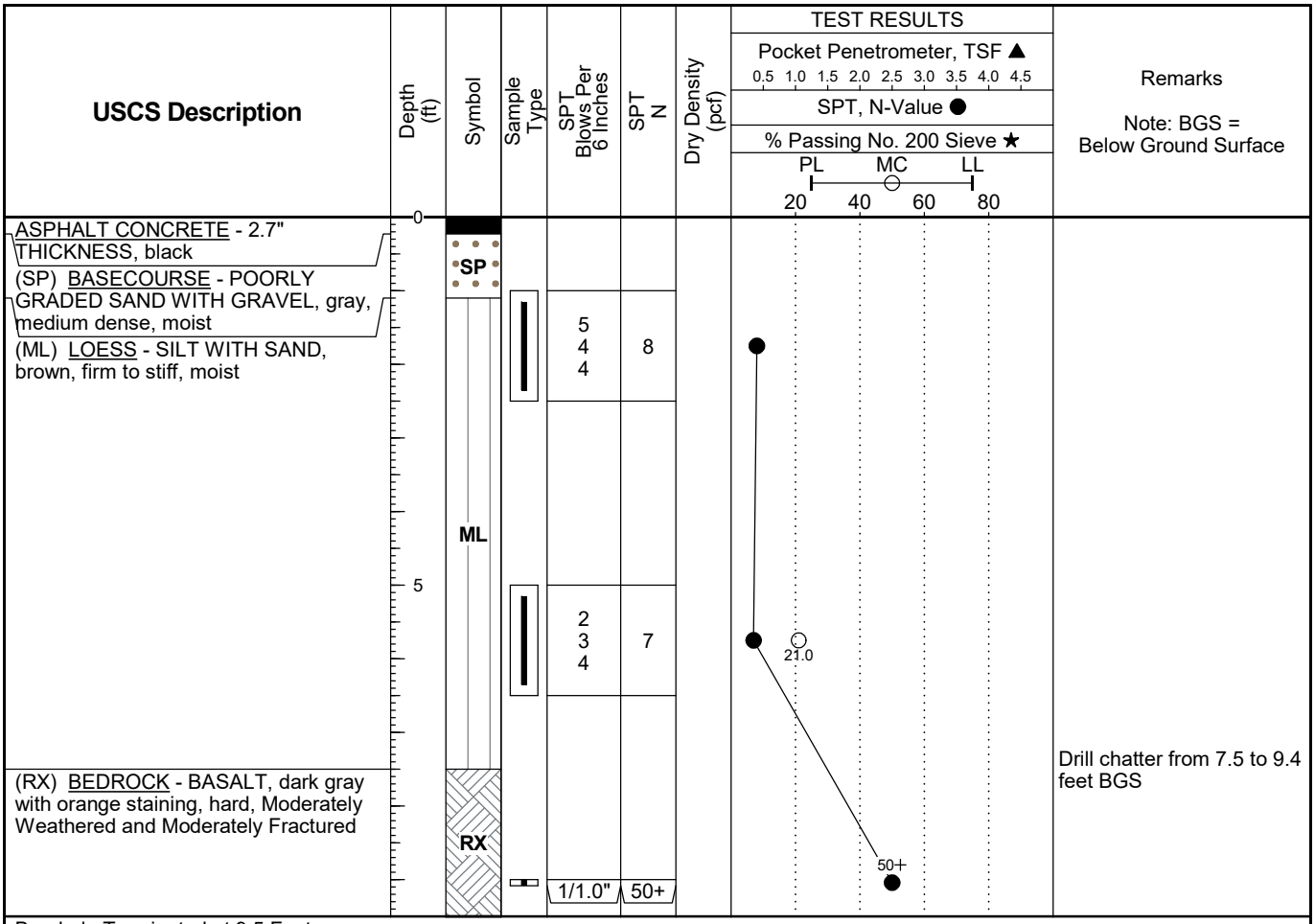
USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks Note: BGS = Below Ground Surface
ASPHALT CONCRETE - 2.2" THICKNESS, black	0	SP	BK BG					
(SP) BASE COURSE - POORLY GRADED SAND WITH GRAVEL, gray, medium dense, moist		ML	BK					
(ML) UNCONTROLLED FILL - SILT WITH GRAVEL AND COBBLES, brown, medium dense, moist				1 1 1	2		11.9	
(ML) LOESS - SILT WITH SAND, brown, soft to stiff, moist	5	ML		2 3 5	8		50+	
(RX) BEDROCK - BASALT, dark gray with orange staining, hard, Moderately Weathered and Moderately Fractured		RX		1/1.0"	50+			Drill chatter from 9.0 to 9.4 feet BGS
Borehole Terminated at 9.5 Feet.								Borehole terminated due to practical refusal on dense bedrock. Borehole plugged with bentonite and patched with cold mix asphalt

Client: Keller Associates	**Boring Number:** B-23073A-3
Project: MO23073A	**Date Drilled:** 10-16-2023
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.
Depth to Groundwater: N.E.	**Logged By:** AJA

GeoProfessional Innovation.

EXPLORATORY BORING LOG

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ



Client: Keller Associates	**Boring Number:** B-23073A-4
Project: MO23073A	**Date Drilled:** 10-16-2023
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.
Depth to Groundwater: N.E.	**Logged By:** AJA

GeoProfessional Innovation.

EXPLORATORY BORING LOG

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
ASPHALT CONCRETE - 4.5" THICKNESS, black (SP) BASE COURSE - POORLY GRADED SAND WITH GRAVEL, gray, medium dense, moist (ML) UNCONTROLLED FILL - SILT WITH SAND, brown, soft, moist	0	SP ML		4 1 1	2		○ 9.9	Trace crushed gravel in sample.
(ML) LOESS - SILT WITH SAND, brown, firm, moist	5	ML		1 2 2	4			
(RX) BEDROCK - BASALT, very dense, Highly weathered and Highly Fractured	10	RX		16 26 25	51			Drill chatter from 9.0 to 10.0 feet BGS Borehole plugged with bentonite and patched with cold mix asphalt
Borehole Terminated at 11.5 Feet.								

Client: Keller Associates	**Boring Number:** B-23073A-5	GeoProfessional Innovation.	**EXPLORATORY BORING LOG**
Project: MO23073A	**Date Drilled:** 10-16-2023		
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.		
Depth to Groundwater: N.E.	**Logged By:** AJA		Sheet 1 Of 1

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks Note: BGS = Below Ground Surface
ASPHALT CONCRETE - 2.8" THICKNESS, black BST - 6.0" THICKNESS, black (GM) UNCONTROLLED FILL - SILTY GRAVEL WITH COBBLES, dark brown, loose to medium dense, moist	0							Heavy drill chatter at 2.0 to 7.5 feet BGS
		GM		14 13 12	25			
	5			4 3 4	7			
				5 10 13	23		7.3	
Borehole Terminated at 9.0 Feet.								Borehole plugged with bentonite and patched with cold mix asphalt

Client: Keller Associates	**Boring Number:** B-23073A-6	GeoProfessional Innovation.	**EXPLORATORY BORING LOG**
Project: MO23073A	**Date Drilled:** 10-16-2023		
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.		
Depth to Groundwater: N.E.	**Logged By:** AJA		Sheet 1 Of 1

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
ASPHALT CONCRETE - 2.7" THICKNESS, black BST - 3.0" THICKNESS, black (SM) ALLUVIUM - SILTY SAND, brown, loose to medium dense, moist	0		BK	2 2 3	5		○ 6.1 ★	
	5	SM		5 6 6	12			
	10			6 11 12	23			
Borehole Terminated at 12.0 Feet.								Borehole plugged with bentonite and patched with cold mix asphalt

Client: Keller Associates	**Boring Number:** B-23073A-7	GeoProfessional Innovation.	**EXPLORATORY BORING LOG**
Project: MO23073A	**Date Drilled:** 10-16-2023		
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.		
Depth to Groundwater: N.E.	**Logged By:** AJA		Sheet 1 Of 1

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
ASPHALT CONCRETE - 4.5" THICKNESS, black	0	SP						
(SP) BASE COURSE - POORLY GRADED SAND WITH GRAVEL, gray, medium dense, moist								
(SM) FILL - SILTY SAND WITH GRAVEL		SM						
(SM) ALLUVIUM - SILTY SAND, brown, loose, moist	5			1 2 2	4		●	
		SM						
Borehole Terminated at 11.5 Feet.	10			2 2 3	5		●	Borehole plugged with bentonite and patched with cold mix asphalt

Client: Keller Associates	**Boring Number:** B-23073A-8	GeoProfessional Innovation.	**EXPLORATORY BORING LOG**
Project: MO23073A	**Date Drilled:** 10-16-2023		
Drill Rig: G2400	**Borehole Diameter:** 8" O.D.		
Depth to Groundwater: N.E.	**Logged By:** AJA		Sheet 1 Of 1

GPI BORING - GPI.GDT - 5/16/25 08:33 - V:\ENGINEERING\GINT FILES\2023\UNSORTED\23073A GUN CLUB ROAD.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(ML) UNCONTROLLED FILL - SILT WITH SAND GRAVEL, AND COBBLES, brown, loose, moist	0.0	ML		BK	24.0					Trace vegetation and organics at the ground surface. Debris including metal, concrete, paper, plastic, and wood encountered from 0 to 7 feet below ground surface.
	2.5									
	5.0									
(ML) LOESS - SILT WITH SAND, tan, firm, moist	7.5	ML		BG						
	10.0									
(RX) BEDROCK - BASALT, highly to moderately weathered, highly fractured, dark gray with whiteish orange staining, hard	12.5	RX								
Test Pit Terminated at 13.0 Feet.										Test pit terminated at 13 feet due to refusal on dense bedrock. Loosely backfilled upon completion.

Client: Keller Associates	**Test Pit Number:** TP-23073A-1
Project: MO23073A	**Date Excavated:** 03-07-2025
Backhoe: CASE 580	**Bucket Width:** 2.0 feet
Depth to Groundwater: N.E.	**Logged By:** AJA

GeoProfessional Innovation

EXPLORATORY TEST PIT LOG

Sheet 1 Of 1

GPI TEST PIT - GPI.GDT - 5/16/25 08:28 - V:\ENGINEERING\GINT FILES\2025\250307 MO23073A GUN CLUB ROAD TEST PITS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(ML) UNCONTROLLED FILL - SILT WITH SAND GRAVEL, AND COBBLES, brown, loose, moist	0.0	ML								Trace vegetation at ground surface. Debris including wood, plastic, and asphalt encountered from 0 to 5 feet below ground surface.
(ML) LOESS - SILT WITH SAND, tan, firm, moist	2.5 5.0	ML		RG		100.7	15.1			Direct Shear Phi = 36.5 degrees C = 325 psf
(RX) BEDROCK - BASALT, highly to moderately weathered, highly fractured, dark gray with whiteish orange staining, hard	7.5 10.0	RX								
Test Pit Terminated at 12.0 Feet.										Test pit terminated at 12 feet below ground surface upon refusal due to bedrock density. Loosely backfilled opun completion.

Client: Keller Associates	**Test Pit Number:** TP-23073A-2
Project: MO23073A	**Date Excavated:** 03-07-2025
Backhoe: CASE 580	**Bucket Width:** 2.0 feet
Depth to Groundwater: N.E.	**Logged By:** AJA

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EXPLORATORY TEST PIT LOG

Sheet 1 Of 1

GPI TEST PIT - GPI.GDT - 5/16/25 08:28 - V:\ENGINEERING\GINT FILES\2025\250307 MO23073A GUN CLUB ROAD TEST PITS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(ML) UNCONTROLLED FILL - SILT WITH SAND GRAVEL AND COBBLES, brown, loose, moist	0.0	ML								Trace vegetation and organics at ground surface.
(ML) LOESS - SILT WITH SAND, light tan, loose, moist	2.5			BK						
	5.0	ML								
	7.5									
	10.0									
(RX) BEDROCK - BASALT, highly to moderately weathered, highly fractured, whiteish with orange staining		RX								
Test Pit Terminated at 12.0 Feet.										Test pit terminated at 12 feet below ground surface upon refusal due to bedrock density. Loosely backfilled upon completion.

Client: Keller Associates	**Test Pit Number:** TP-23073A-3	GeoProfessional Innovation.	**EXPLORATORY TEST PIT LOG**
Project: MO23073A	**Date Excavated:** 03-07-2025		
Backhoe: CASE 580	**Bucket Width:** 2.0 feet		Sheet 1 Of 1
Depth to Groundwater: N.E.	**Logged By:** AJA		

GPI TEST PIT - GPI.GDT - 5/16/25 08:28 - V:\ENGINEERING\GINT FILES\2025\250307 MO23073A GUN CLUB ROAD TEST PITS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(ML) TOPSOIL - SILT, brown, loose, moist	0.0	ML								Trace vegetation and organics to 8 inches below ground surface.
(ML) UNCONTROLLED FILL - SILT WITH SAND, GRAVEL AND COBBLES, brown, loose, moist	2.5	ML								Debris including metal, plastic, and glass encountered from 1 to 6 feet below ground surface.
(GM) UNCONTROLLED FILL - SILTY GRAVEL WITH COBBLES AND BOULDERS, gray, dense, moist	5.0	GM								Boulders up to 2 feet in diameter from 6 to 8 feet below ground surface.
(ML) LOESS - SILT WITH SAND, tan, firm, moist	7.5	ML								
(RX) BASALT, highly to moderately weathered, highly fractured, dark gray whiteish orange staining, hard	10.0	RX								
Test Pit Terminated at 12.0 Feet.										Test pit terminated at 12 feet below ground surface upon refusal to due bedrock density. Loosely backfilled upon completion.

Client: Keller Associates	**Test Pit Number:** TP-23073A-4
Project: MO23073A	**Date Excavated:** 03-07-2025
Backhoe: CASE 580	**Bucket Width:** 2.0 feet
Depth to Groundwater: N.E.	**Logged By:** AJA

GeoProfessional Innovation

EXPLORATORY TEST PIT LOG

Sheet 1 Of 1

GPI TEST PIT - GPI.GDT - 5/16/25 08:28 - V:\ENGINEERING\GINT FILES\2025\250307 MO23073A GUN CLUB ROAD TEST PITS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(ML) UNCONTROLLED FILL - SILT WITH SAND, GRAVEL AND COBBLES, brown, loose, moist	0.0									Trace vegetation and organics.
	2.5	ML								Debris including plastic, glass, and metal encountered from 0 to 5 feet below ground surface.
(ML) LOESS - SILT WITH SAND, brown, firm, moist	5.0			BG	52.0					
	7.5									
		ML								
	10.0									
	12.5									
Test Pit Terminated at 14.0 Feet.										Test pit terminated at 14 feet below ground surface, loosely backfilled upon completion.

Client: Keller Associates	**Test Pit Number:** TP-23073A-5	GeoProfessional Innovation.	**EXPLORATORY TEST PIT LOG**
Project: MO23073A	**Date Excavated:** 03-07-2025		
Backhoe: CASE 580	**Bucket Width:** 2.0 feet		Sheet 1 Of 1
Depth to Groundwater: N.E.	**Logged By:** AJA		

GPI TEST PIT - GPI.GDT - 5/16/25 08:29 - V:\ENGINEERING\GINT FILES\2025\250307 MO23073A GUN CLUB ROAD TEST PITS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(ML) TOPSOIL - SILT, brown, loose, moist	0.0	ML								Trace vegetation and organics from 0 to 1 foot below ground surface.
(ML) UNCONTROLLED FILL - SILT WITH SAND, GRAVEL AND COBBLES, brown, loose, moist	2.5	ML								Debris including metal, plastic, and glass encountered from 0 to 5 feet below ground surface.
(ML) LOESS - SILT WITH SAND, brown, firm, moist	5.0	ML								
(RX) BASALT, highly to moderately weathered, highly fractured, dark gray whiteish orange staining, hard	7.5	RX								
Test Pit Terminated at 8.5 Feet.										Test pit terminated at 8.5 feet below ground surface upon refusal to due bedrock density. Loosely backfilled upon completion.

Client: Keller Associates	**Test Pit Number:** TP-23073A-6	GeoProfessional Innovation.	**EXPLORATORY TEST PIT LOG**
Project: MO23073A	**Date Excavated:** 03-07-2025		
Backhoe: CASE 580	**Bucket Width:** 2.0 feet		Sheet 1 Of 1
Depth to Groundwater: N.E.	**Logged By:** AJA		

GPI TEST PIT - GPI.GDT - 5/16/25 08:29 - V:\ENGINEERING\GINT FILES\2025\250307 MO23073A GUN CLUB ROAD TEST PITS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(ML) UNCONTROLLED FILL - SILT WITH GRAVEL AND COBBLES, brown, loose, moist	0.0	ML								Trace vegetation and organics at ground surface.
(ML) LOESS - SILT, brown, firm, moist	2.5	ML								
(RX) BASALT, highly to moderately weathered, highly fractured, dark gray whiteish orange staining, hard	5.0	RX								
Test Pit Terminated at 8.0 Feet.	7.5									Test pit terminated at 8 feet below ground surface upon refusal to due bedrock density. Loosely backfilled upon completion.

Client: Keller Associates	**Test Pit Number:** TP-23073A-7	GeoProfessional Innovation.	**EXPLORATORY TEST PIT LOG**
Project: MO23073A	**Date Excavated:** 03-07-2025		
Backhoe: CASE 580	**Bucket Width:** 2.0 feet		Sheet 1 Of 1
Depth to Groundwater: N.E.	**Logged By:** AJA		

GPI TEST PIT - GPI.GDT - 5/16/25 08:29 - V:\ENGINEERING\GINT FILES\2025\250307 MO23073A GUN CLUB ROAD TEST PITS.GPJ

APPENDIX B

Laboratory Test Results

GeoProfessional Innovation

Project Name: Gun Club Rd, Lapwai Rd to Stewart Ave
Project Number: MO23073A
Client: Keller Associates

Laboratory Test Results Summary

Boring/Test Pit	Depth (feet)	Lab Number	Description (U.S.C.S. Classification)	In situ Moisture, %	In situ Dry Density, pcf	Max Dry Density, pcf	Optimum Moisture, %	C, psf	ϕ, deg	Atterberg Limits		#200 Sieve Passing, %	Organic Matter, %	Cation Exchange Capacity (meq/100g)	pH	Resistivity Ω·cm	Sulfates ppm
										Liquid Limit	Plasticity Index						
B-23073A-1	0.5-1.0	15722	Poorly-Graded Sand with Gravel (SP)	3.3		-	-	-	-	-	-	4.7	-	-	-	-	-
B-23073A-1	1.5-2.5	15723	Sandy Silt (ML)	13.2		112.5	15.5	-	-	23	4	53	-	-	-	-	-
TP-23073A-2	6.5-7.0	19807	Silt with Sand (ML)	15.1	100.7	-	-	325	36.5	-	-	-	-	-	-	-	-
B-23073A-3	2.5-4.0	15724	Silt with Sand (ML)	11.9		-	-	-	-	-	-	-	-	-	-	-	-
B-23073A-4	5.0-6.5	15725	Silt with Sand (ML)	21.0		-	-	-	-	-	-	-	1.55	12.7	8.7	2,700	72.9
B-23073A-5	2.5-4.0	15726	Silt with Sand (ML)	9.9		-	-	-	-	-	-	-	-	-	-	-	-
B-23073A-6	7.5-9.0	15727	Silty Gravel with Cobbles (GM)	7.3		-	-	-	-	-	-	-	-	-	-	-	-
B-23073A-7	1.0-2.5	15729	Silty Sand (SM)	6.1		115.0	12.5	-	-	Non-Plastic		43	-	-	-	-	-
B-23073A-7	10.0-11.5	15728	Silty Sand (SM)	13.3		-	-	-	-	-	-	-	-	-	-	-	-
B-23073A-8	5.0-6.5	19808	Silty Sand (SM)	-	-	-	-	-	-	-	-	-	1.58	15.2	8.7	1,370	70.5
TP-23073A-1	2.0-3.0	19308	Silty Sand with Gravel (SM)	-		-	-	-	-	-	-	24	-	-	8.2	2,860	9.0
TP-23073A-5	5.0-6.0	19307	Silt (ML)	-		-	-	-	-	-	-	52	-	-	8.2	1,690	60.0

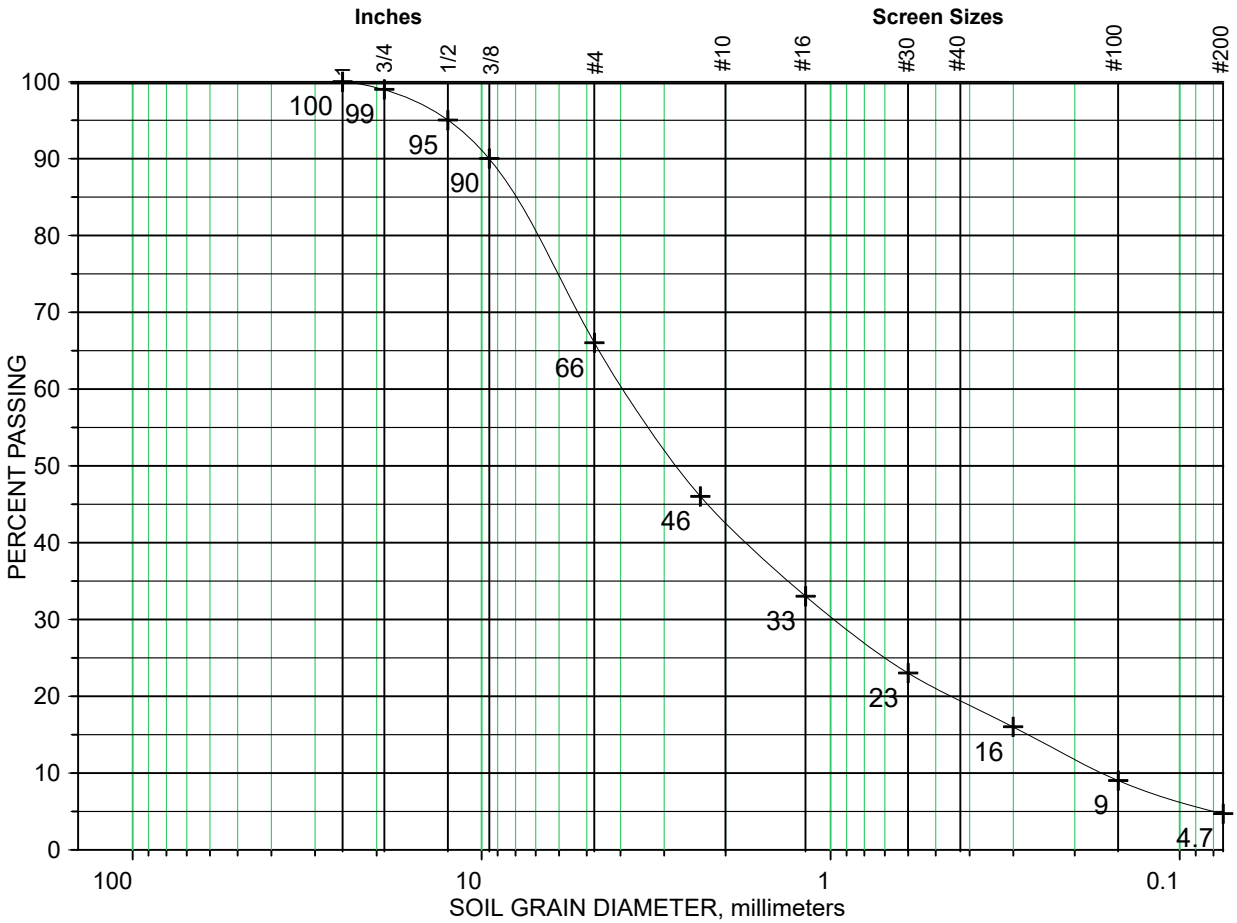
Reviewed By: Andy Abra

GRADATION ANALYSIS

ASTM D6913

Project Name: Gun Club Rd, Lapwai Rd to Stewart Ave
Project Number: MO23073A
Client: Keller Associates
Lab Number: 15722
Sample Location: B-23073A-1 @ 0.5-1.0 feet BGS
Sample Classification: Poorly-Graded Sand with Gravel (SP)
Date Tested: 11/2/2023 By: SS

Cobbles	Gravel		Sand		
	Coarse	Fine	Coarse	Medium	Fine



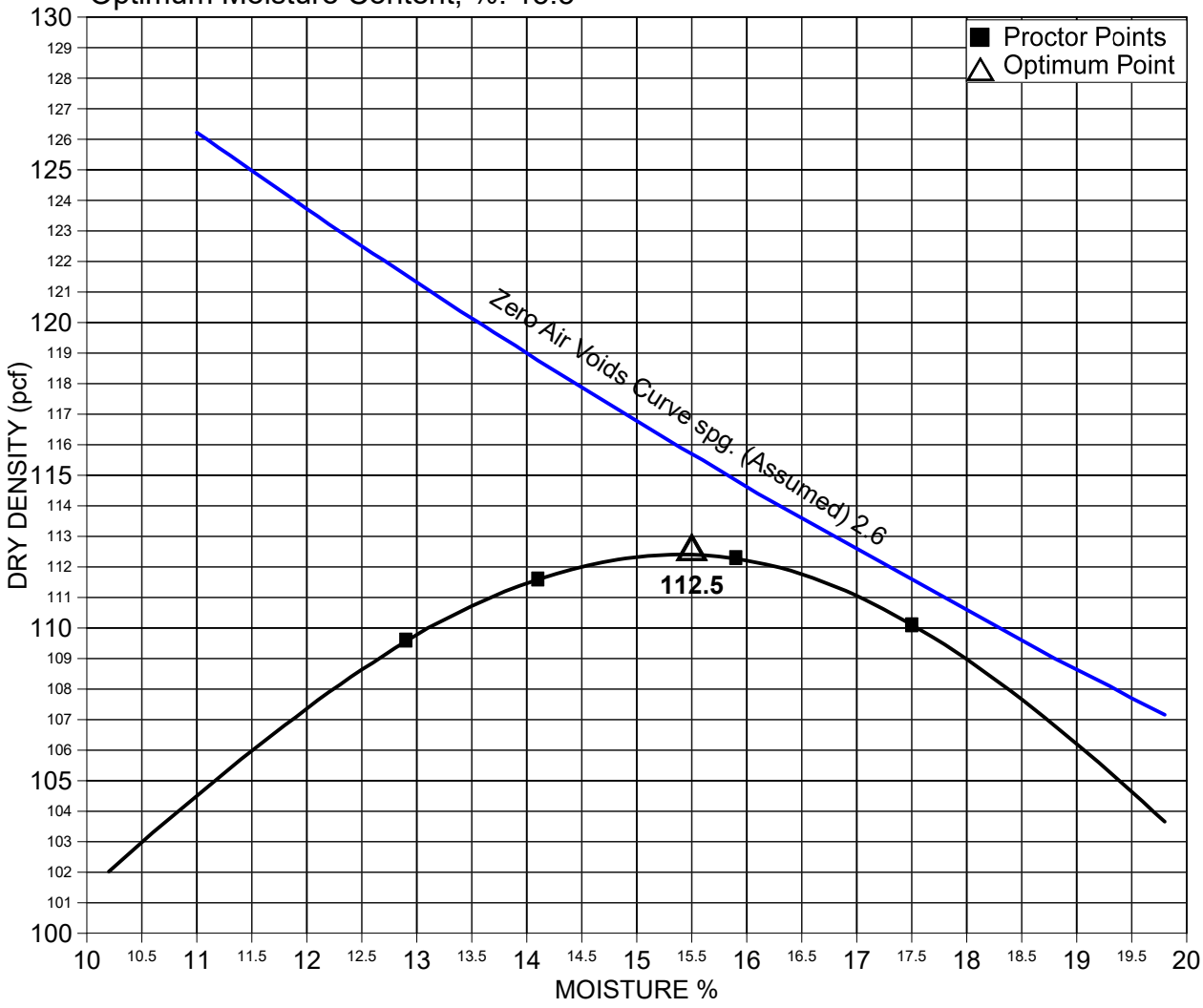
Reviewed by: Campbell

GeoProfessional Innovation.

MOISTURE-DENSITY RELATIONSHIP CURVE
ASTM D 1557
Method A

Project Name: Gun Club Rd, Lapwai Rd to Stewart Ave
Project Number: MO23073A
Client: Keller Associates
Lab Number: 15723
Sample Location: B-23073A-1 @ 1.5-2.5 feet BGS
Sample Classification: Sandy Silt (ML)
Date Tested: 11/9/2023 By: SS
Rammer Type: Manual

Maximum Dry Density, pcf : 112.5
Optimum Moisture Content, %: 15.5



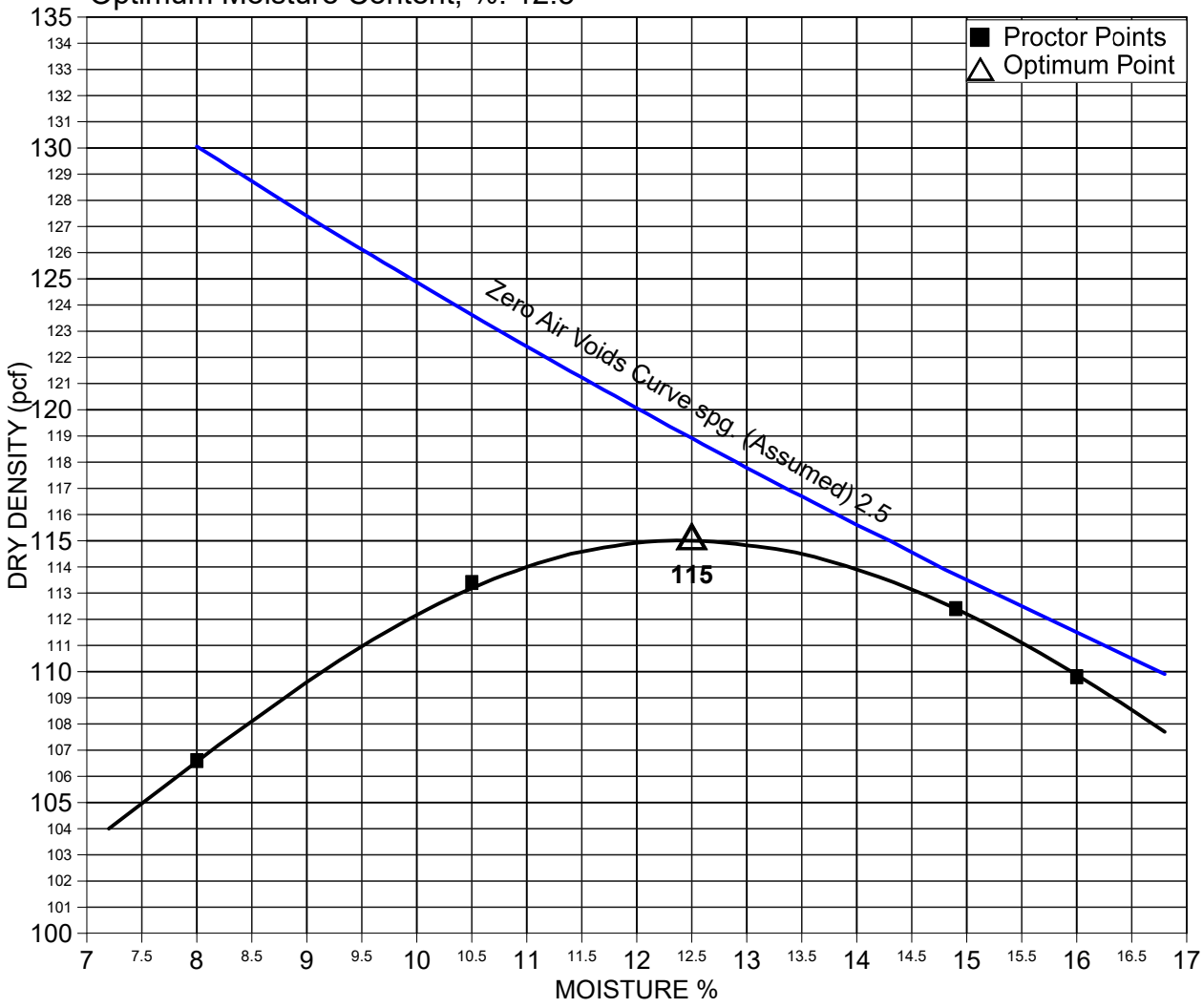
Reviewed By: _____

GeoProfessional Innovation.

MOISTURE-DENSITY RELATIONSHIP CURVE
ASTM D 1557
Method A

Project Name: Gun Club Rd, Lapwai Rd to Stewart Ave
Project Number: MO23073A
Client: Keller Associates
Lab Number: 15729
Sample Location: B-23073A-7 @ 1.0-3.0 feet BGS
Sample Classification: Silty Sand (SM)
Date Tested: 01/22/2024 By: RG
Rammer Type: Manual

Maximum Dry Density, pcf : 115.0
Optimum Moisture Content, %: 12.5



Reviewed By: _____

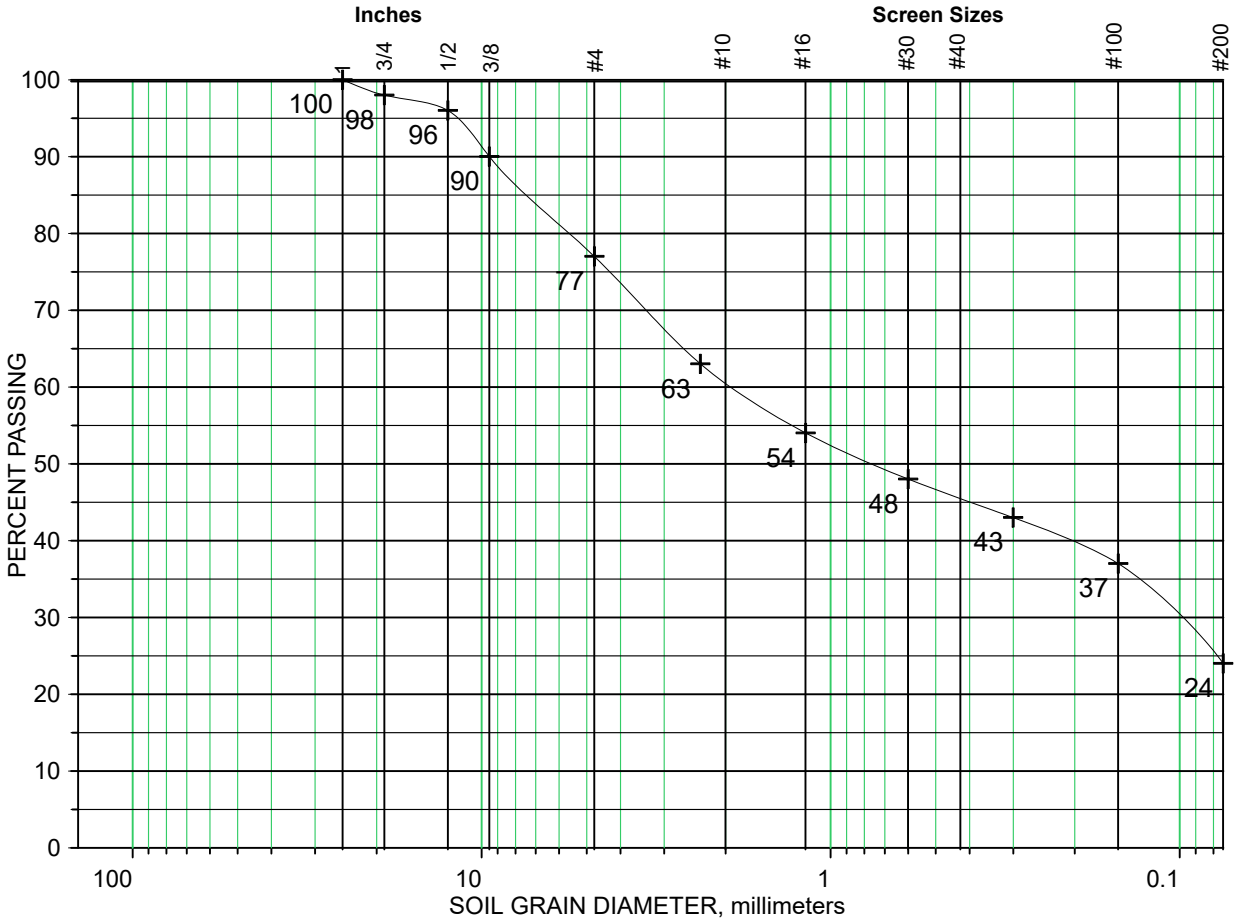
GeoProfessional Innovation.

GRADATION ANALYSIS

ASTM D6913

Project Name: Gun Club Rd, Lapwai Rd to Stewart Ave
Project Number: MO23073A
Client: Keller Associates
Lab Number: 19308
Sample Location: TP-23073A-1 @ 2.0-3.0 feet BGS
Sample Classification: Silty Sand with Gravel (SM)
Date Tested: 03/12/2025 By: GD

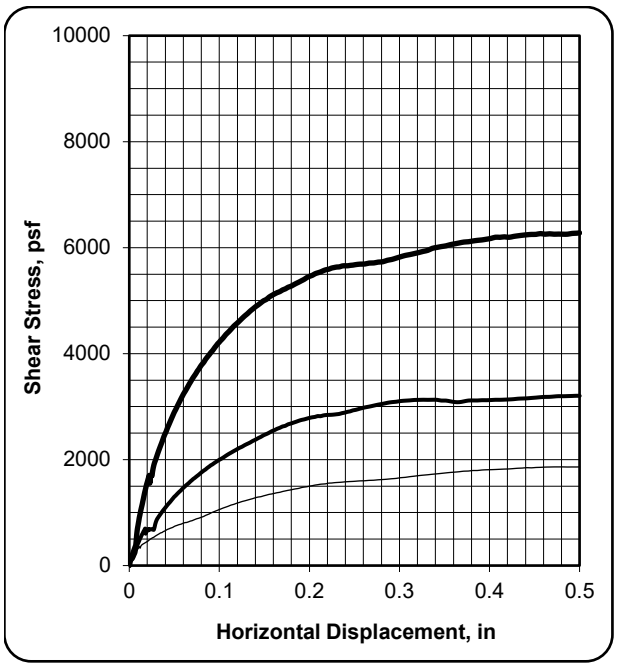
Cobbles	Gravel		Sand		
	Coarse	Fine	Coarse	Medium	Fine

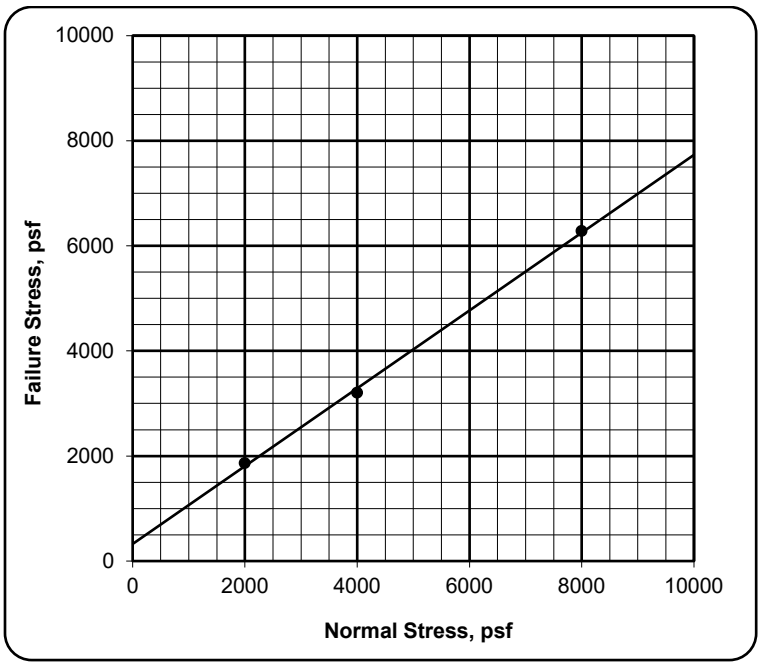


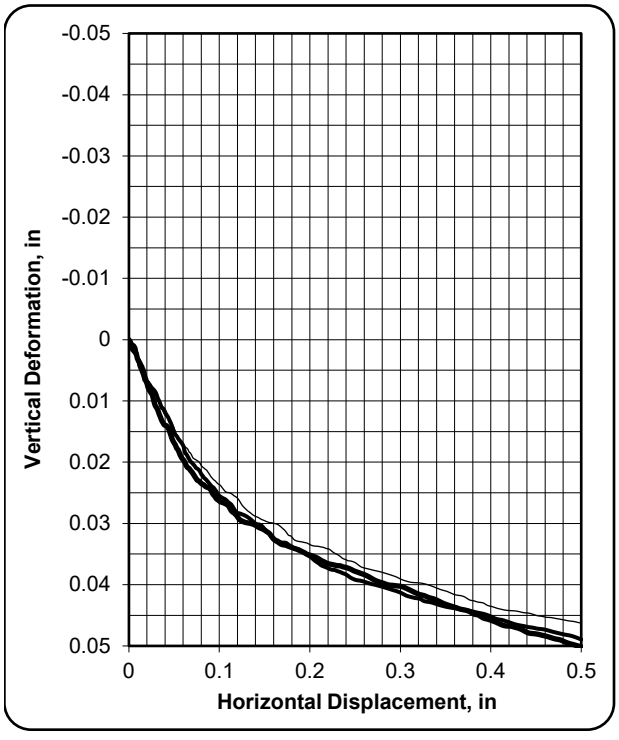
Reviewed by: Campbell

GeoProfessional Innovation.

Direct Shear Test Report - ASTM D-3080







	Sample Number	1	2	3
Initial	Water Content, %	15.1	15.1	15.1
	Dry Density, pcf	102.1	100.5	100.7
	Saturation, %	64.4	61.9	62.2
	Void Ratio	0.62	0.65	0.64
	Diameter, in	2.421	2.421	2.421
	Height, in (before consol.)	0.995	0.995	0.995
At Test	Water Content, %	17.8	17.6	16.6
	Dry Density, pcf	104.3	105.8	108.9
	Saturation, %	80.3	83.1	84.9
	Void Ratio	0.59	0.56	0.52
	Diameter, in	2.421	2.421	2.421
	Height, in (prior to shear)	0.974	0.945	0.920
	Normal Stress, psf	2000	4000	8000
	Failure Stress, psf	1863	3204	6278
	Displacement @ Failure, in	0.50	0.50	0.50
	Time to Failure, min	100.0	99.3	100.0
	Ultimate Stress, psf	1863	3203	6278
	Displacement @ Ultimate, in	0.50	0.50	0.50
	Rate of Strain, in/min	0.0050	0.0050	0.0050

Client	GeoProfessional Innovation
Project	Gun Club Road
Project Number	108524-025
Sample Location	TP-23073A-2, Ring; 6.5'-7.0'
Lab Number	25-0268
Date	3/31/2025

Sample Type	In-situ
Description	Silt with Sand (ML)
Sp. Gravity (assumed)	2.650

C, psf	325
ϕ , deg	**36.5**
tan ϕ	0.741

Tested by: PC

Reviewed by: Travis Thomsen

SHANNON & WILSON

APPENDIX C

LTPP Bind Online Software Output

General Project Information

Project Number: 23881
Project Title: Gun Club Road
Project Description:

Climatic Data Source (LTPP VWS)

Latitude, Degree: 47.63402
Longitude, Degree: -116.86674

Climatic Data

Lowest Yearly Air Temperature, ºC: -17.97
Low Air Temp Standard Deviation, ºC: 4.27
Yearly Degree-Days > 10 Deg. ºC: 0.00
High Air Temperature of high 7 days: 34.01
Standard Dev. of the high 7 days: 1.97
Low Pavement Temperature 50%*: -18.55
Low Pavement Temperature 98%*: -26.21
High Avg Pavement Temperature of 7 Days 50%: 56.54
High Avg Pavement Temperature of 7 Days 98%: 60.68

Target Rut Depth

Target Rut Depth (mm): 12.5

Temperature Adjustments

Depth of Layer, mm: 100
Base HT PG: 70

Traffic Adjustments

Traffic loading Cumulative ESAL for the Design Period, Millions: 1.2
Traffic Speed (Fast: >70 km/h, Slow: 20-70 km/h, Standing: < 20 km/h): Fast

Performance Grade

AASHTO M320-10 Performance-Graded Asphalt Binder		
PG Temperature	**High**	**Low**
Performance Grade Temperature at 50% Reliability*	23.2	-14.8
Performance Grade Temperature at 98% Reliability*	24.9	-22.5
Adjustment for Traffic (AASHTO M323-13)	0.0	
Adjustment for Depth	-10.6	4.4
Adjusted Performance Grade Temperature	14.3	-18.1
Selected PG Grade	**52**	**-22**
PG Grade	**M323, PG 52-22**	

AASHTO M 332-14 Performance-Grade Asphalt Binder using Multiple Stress Creep Recovery (MSCR) Test		
PG Temperature	**High**	**Low**
Performance Grade Temperature at 50% Reliability*	23.2	-14.8
Performance Grade Temperature at 98% Reliability*	24.9	-22.5
Designation for traffic loading	S	
Selected PG Grade	**52**	**-22**
PG Grade	**M332, PG 52S-22**	
Temperature Report		
Lowest Yearly Air Temperature, ºC:	-17.97	
Low Air Temp Standard Deviation, ºC:	4.27	
Yearly Degree-Days > 10 Deg. ºC:	0.00	
High Air Temperature of high 7 days:	34.01	
Standard Dev. of the high 7 days:	1.97	
Low Pavement Temperature 50%*:	-18.55	
Low Pavement Temperature 98%*:	-26.21	
High Avg Pavement Temperature of 7 Days 50%:	56.54	
High Avg Pavement Temperature of 7 Days 98%:	60.68	

* Note: These data are based on using the lowest overall pavement temperature in the analysis record (1980 – 2023) while the values presented in other tables are based on the annual average lowest temperature.